Glossary

This glossary includes definitions from several sources. A superscript number next to a word identifies the reference from which the definition was adapted (listed at the end of the Glossary).

Abiotic [1,2] Devoid of life; nonliving. In reference to environmental factors includes temperahue, pH, humidity, and other physical and chemical influences.

Absorption.[3] The net movement (transport) of water and solutes from outside a cell or organism to the interior.

Absorption Efficiency. A measure of the rate at which an organism absorbs a substance across exchange boundaries (e.g., gastrointestinal tract).

Accuracy [20] measure of the closeness of a statistic obtained using a certain sampling procedure to the true value of a population parameter.

Acute.[4] Having a sudden onset, tasting a short time. Of a stimulus, severe enough to induce a response rapidly. Can be used to define either the exposure or the response to an exposure (effect).

Acute Teats. The duration of an acute aquatic toxicity test is generally 4 days or less and mortality is the response usually measured. A toxicity test of short duration, typically 4 days or less. and usually of short duration relative to the lifespan of the test organism.

Administered Dose? The mass of a substance given to an organism and in contact with an exchange boundary (i.e.. gastrointestinal tract) per unit body weight per unit time (e.g., mg/kg-day)

Adsorption.[3] The surface retention of solid, liquid, or gas molecules, atoms, or ions by a solid. or liquid, as opposed to absorption, the penetration of substances into the bulk of the solid or liquid.

Algorithm.[3] A set of well-defined rules for the solution of a problem in a finite number of steps.

Allometry.[3] The quantitative relation between a part and the whole or another part as the organism increases in size.

Analyte.[5] The chemicals for which a sample is analyzed.

Antagonism.[6] In toxicology a situation in which two chemicals, administered together, interfere with each other's actions or one interferes with the action of the other chemical. The result is that the combined effect of the two chemicals is much less than the sum of the effect of each agent given atone.

Anthropogenic.[3] Referring to environmental alterations resulting from the presence or activities of humans.

Areal.[2] Any particular extent of space or surface. as a geographical region.

Area Use Factor. The ratio of an organism's home range, breeding range. or feeding/foraging range to the area of contamination or the site area under investigation.

Assessment Endpoint.[7] An explicit expression of the environmentat value that is to be protected.

Avian.[8] Of, relating to, or derived from birds (Aves).

Benthic.[3] Of, pertaining to, or living on the bottom or at the greatest depths of a large body of water.

Bias.[3,20] In estimating the value of a parameter of a probability distribution, it refers to the difference between the expected value of the estimator and the true value of the parameter. In biostatistics, bias is a consistent under- or overestimate of the true population parameter by a statistic. Statisticat bias is usually a result of a consistent inaccuracy in a sampling procedure or, in some cases, a formula.

Bioaccumulation.[4] General term describing a process by which chemicals are taken up by an organism either directly from exposure to a contaminated medium or by consumption of food containing the chemical. Test used to evaluate the relative potency of a chemical.

Bioassay.[4] Test used to evaluate the relative potency of a chemical by comparing its effect on living organisms with the effect of a standard preparation on the same type of organism. Bioassay and toxicity teats arc not the same - see toxicity test.

Bioavailability.[9] The degree to which a material in environmental media is assimilable by an organism.

Bioconcentration[4] A process by which there is a net accumulation of a chemical directly from an exposure medium into an organism.

Bioconcentration Factor (BCF).[10] Provides a measure of the extent of chemical partitioning at equilibrium between a biological medium such as fish tissue or plant tissue and an external medium such as water, soil, or sediment. The higher the BCF, the greater the accumulation in living tissue is likely to be.

Biomagnification.[4] Result of the process of bio-accumulation by which tissue concentrations of chemicals increase as the chemical passes up through two or more trophic levels. The term implies an efficient transfer of the chemical from food to consumer.

Biomarker.[11] General molecular change that is taken as an indicator of pollution/stress. May be general or specific.

Biotic.[2] Pertaining to life or living organisms, caused or produced by or comprising living organisms.

Body Burden. The concentration of a material which accumulates in the biological tissues of an exposed organism.

Breedinn Range. The area utilized by an organism during the reproductive phase of its life cycle and during the time that young are teared.

Characterization of Ecological Effects.[7] A portion of the analysis phase of ecological risk assessment that evaluates the ability of a stressor to cause adverse effects under a particular set of circumstances.

Characterization of Exposure.[7] A portion of the analysis phase of ecological risk assessment that evaluates the interaction of the stressor with one or more ecological components. Exposure can be expressed as co-occurrence, or contact depending on the stressor and ecological component involved.

Chemicals of Potential Ecological Concern. Chemicals that are potentially site-related and have the potential to adversely affect ecological receptors due to concentration, distribution, and/or mode of toxicity.

Chronic. Involving a stimulus that is lingering or con-tinues for a long time; often signifies periods from several weeks to years, depending on the reproductive life cycle of the species. Can be used to define either the exposure or the response to an exposure (effect). Chronic exposures typically induce a biological response of relatively slow progress and long duration.

Chronic Response. The response (effect) of an organism to a chemical which is not immediately or directly lethal to the organism.

Chronic Tests.[12] A toxicity test used to study the effects of continuous, long-term exposure of a chemical or other potentially toxic material on an organism.

Community.[7] An assemblage of populations of different species within a specified location and time.

Concentration[4] Quantifiable amount of a chemical in environmental media.

Concentration Response Curve.[4] The quantitative relationship between exposure concentration and percent of the test population responding.

Correlation.[13] An estimate of the degree to which two sets of variables vary simultaneously, with no distinction between dependent and independent variables.

Degradation.[3] Conversion of an organic compound to one containing a smaller number of carbon atoms.

Depuration.[4] A process that results in elimination of toxic material from an organism.

Direct Effect (toxin).[7] An effect where the stressor itself acts directly on the ecological component of interest, not through other components of the ecosystem.

Dose.[14] A measure of integral exposure. Examples include (1) the amount of a chemical ingested, (2) the amount of a chemical taken up, (3) the product of ambient exposure concentration and the duration of exposure.

Dose-Response (Curve).[4] Similar to concentration-response curve except that the dose (i.e., the quantity) of the chemical administered to the organism is known. The curve is plotted as Dose versus Response.

Dose-Response Evaluation.[5] The process of quantitatively evaluating toxicity information and characterizing the relationship between the dose of a contaminant administered or received and the incidence of adverse health effects in the exposed population. From the quantitative dose-response relationship, toxicity values are derived that are used in the risk characterization step to estimate the likelihood of adverse effects occurring in or to receptors at different exposure levels.

Duplicate.[15] A sample taken from and representative of the same population as another sample. Both samples arc carried through steps of sampling, storage, and analysis in an identical manner.

Ecological Risk Assessment.[7] The process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors.

Ecosystem.[7] The biotic community and abiotic environment within a specified location and time.

Endpoints. See assessment and exposure endpoints.

Error. The difference between a statistic and the true value of a population parameter. It is important to realize that bias and error may arise both in the original collection of data and in the subsequent manipulation of the data.

Excretion.[3] The removal of unusable or excess material from a cell or a living organism.

Exposure.[7] Co-occurrence of or contact between a stressor and an ecological component. The contact reaction between a chemical and a biological system, or organism.

Exposure Assessment' The determination or estimation (qualitative or quantitative) of the magnitude, frequency, duration, and route of exposure.

Exposure Pathway.[5] The course a chemical or physical agent takes from a source to an exposed organism. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, transport/exposure media (i.e., air, water) are also included.

Exposure Point.[5]A location of potential contact between an organism and a chemical or physical agent.

Exposure Route.[5] The way a chemical or physical agent comes in contact with an organism (i.e., by ingestion, inhalation, or dermal contact).

Exposure Scenario.[7] A set of assumptions concerning how an exposure may take place, including assumptions about the exposure setting, stressor characteristics, and activities that may lead to exposure.

Fate.[4] Disposition of a material in various environmental compartments (e.g. soil or sediment, water, air. biota) as a result of transport, transformation. and degradation.

Food Chain.[10] Hierarchical arrangement by trophic level of which species eat other species.

Food Guild. Organisms that feed in a similar manner (i.e., woodpeckers, birds that probe bark for insects).

Food Web." Interconnecting food chains. Such pathways do not always follow a strict progression from a lower trophic level to a higher trophic level. In addition, many species have mixed diets of plant and animal material or change their feeding habits seasonally or at different life stages.

Forage (feeding) Area. The area utilized by an organism for hunting food or gathering food.

Gestation (Period).[3] The period in mammals from fertilization to birth.

Guild.[2] A group of species having similar ecological resource requirements and foraging strategies and, therefore, having similar roles in the community.

Habitat.[1] Place where a plant or animal lives, often characterized by a dominant plant form or physical characteristic.

Hazard. Likelihood that a chemical will cause an injury or adverse effect under specified conditions.

Hazard Identification.[5] The process of determining whether exposure to an agent can cause an increase in the incidence of a particular adverse effect, and whether an adverse effect is likely to occur.

Hazard Index (HI).[5] The sum of more than one hazard quotient for multiple substance and/or multiple exposure pathways.

Hazard Quotient (HQ).[5] The ratio of a single substance exposure level over a specified time (e.g., chronic) to a toxicity value selected for the risk assessment (i.e., LOAEL or NOAEL).

Herbivores? An animal that eats only vegetation.

Home Range.[16] The area to which an animal confines its activities.

Indirect Effect.[7] An effect where the stressor acts on supporting components of the ecosystem, which in turn have an effect on the ecological component of interest

Ingestion Rate. The rate at which an organism consumes food, water, or other materials (i.e., soil, sediment). Ingestion rate is usually expressed in terms of unit of mass or volume per unit of time (i.e., kg/day, L/day).

Invertebrate.[3] An animal lacking a backbone and internal skeleton.

Lethal.[4] Causing death by direct action.

Life Stage. A given phase in the growth and development of an organism (e.g., embryo, larva, fetus, juvenile, adult).

Lipid.[17] One of a variety of organic substances that are insoluble in polar solvents, such as water, but that dissolve readily in nonpolar organic solvents. Includes fats, oils, waxes, steroids, phospholipids, and carotenes.

Liponhilic.[3] Having a strong affinity for fats (lipids).

Log P. See octanol-water partition coefficient.

Lowest-Observed-Effect Concentration (LORC). Same as lowest-observed-effect level except using concentration-response data.

Lowest-Observed-Effect Level (LOEL).[5] In dose-response experiments, the lowest exposure level at which there are statistically or biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control group. Same as LOAEL (lowest-observable-adverse-effect level).

Matrix.[3] The analyte as considered in terms of its being an assemblage of constituents, each with its own property.

Measurement Endpoint.[7] A measurable ecological characteristic that is' related to the valued characteristic chosen as the assessment endpoint, Measurement endpoints are often expressed as the statistical or arithmetic summaries of the observations that make up the measurement.

Media.[18] Specific environments - air, water, soil, sediment - which are the subject of regulatory concern and activities.

Median Effective Concentration (EC_{50}).[4] The concentration of a material to which teat organisms are exposed that is estimated to be effective in producing some sub lethal response in 50 percent of the teat population. The EC_{50} is usually expressed as a time-dependent value (e.g., 24-hour EC_{50}). The sublethal response elicited from the test organisms as a result of exposure must be clearly defined.

Median Effective Dose (ED_{50}). Same as median effective concentration except refers to administered dose instead of concentration.

Median Lethal Concentration (LC_{50}).[4] A statistically or graphically estimated concentration that is expected to be lethal to 50 percent of a group of organisms under specified conditions.

Median Lethal Dose (LD_{50}). Same as median lethal concentration except refers to administered dose instead of concentration.

Mesophyte.[3] A plant requiring moderate amounts of moisture for optimum growth.

Metabolism? The physical and chemical processes by which foodstuffs are synthesized into complex elements (assimilation, anabolism), complex substances are transformed into simple ones (disassimilation, catabolism), and energy is made available for use by organisms.

Metabolize.[3] To transform by metabolism.

Mortality. Death

No-Observed-Effect-Concentration (N0EC). Same as no-observed-effect-level except dealing with exposure concentration.

No-Observed-Effect-Level (NOEL).[4] The highest level of a stressor evaluated in a test that causes no statistically significant difference in effect as compared with the controls. Same as NOAEL (no-observable-adverserse-effect-level).

Octanol-Water Partition Coefficient (K_{ow}).[10] Provides a measure of the extent of chemical partitioning between water and octanol at equilibrium. Octanol is used as a surrogate for lipids (fats) and can be used to predict bioconcentration in aquatic organisms. The logarithm of K, is referred to as the log P. The greater the K_{ow} (or

log P) the more likely a chemical is to partition in lipid than to remain in water.

Parameter. A known characteristic of a population (e.g., density).

pH.[2] A numerical measure of acidity or hydrogen ion activity. Neutral is pH 7. All pH values below 7 are acid, and all above 7 arc alkaline.

Phreatophyte.[3] A plant with a deep root system which obtains water from the groundwater or the capillary fringe above the water table.

Piscivorous.[3] Feeding on fish.

Population.[20] An aggregate of individuals of a species within a specified location in space and time. In biostatistics, population is the entire collection of individual Sample Units that are potentially observable in an ecological community. It is from this population that a sample will be drawn and statistical inferences made.[20]

Population Dynamics.[3] The aggregate of processes that determine the size and composition of any population.

Precipitation.[3] The process of producing a separable solid phase within a liquid medium.

Precision.[20] A measure of the degree of repeatability of a statistic in replicated samples using a certain sampling procedure. The standard error is considered the basic expression of sampling precision, Note that it is possible to have a precise estimate without accuracy, since a particular sampling procedure may be precise but biased.

Predator.[3] An animal that preys on other animals as a source of food.

Primary Producers.[10] Green plants (including algae and microscopic aquatic plants called phytoplankton) which capture solar energy through photosynthesis which converts carbon dioxide and water into carbohydrates, a form of energy storage suitable for use by other organisms.

Receptor. A biotic component of the ecosystem that is or may be adversely affected by a chemical or other stressor.

Reference.[14] A relatively unpolluted site used for comparison to polluted sites in environmental monitoring studies, often incorrectly referred to as a control.

Reference Dose (RfD).[5] The US EPA's preferred toxicity value for evaluating noncarcinogenic effects resulting from exposures at Superfund sites. Can refer to a variety of exposure durations or effects (e.g., acute, chronic, subchronic, developmental). The acronym RfD, when used without modifiers, either refers generically to all types of RfDs, or specifically to chronic RfDs.

Residue. See body burden.

Risk.[4] A statistical concept defined as the expected frequency or probability of undesirable effects resulting from a specific exposure to known or expected environmental concentrations.

Risk Assessment. The technical evaluation of the degree of hazard or risk associated with exposure of a receptor or receptor populations to contamination of an environmental medium or media.

Risk Characterization.[7] A phase of ecological risk assessment that integrates the results of the exposure and ecological effects analyses to evaluate. the likelihood of adverse ecological effects associated with exposure to the stressor. The ecological significance of the adverse effects is discussed, including consideration of the types and magnitudes of the effects, their spatial and temporal **patterns,** and the likelihood of recovery.

Risk Management[5] The process of weighting policy alternatives and selecting the most appropriate regulatory action, integrating the results of risk assessment with engineering data and with social. economic, and political concerns to reach a decision.

Sample.[3] Representative fraction of a material tested or analyzed; a selection or collection from a larger collection.

Sediment.[19] Particulate material lying below water.

Species.[17] A group of organisms that actually or potentially interbreed and are reproductively isolated from all other such groups; a taxonomic grouping of morphologically similar individuals; the category below genus.

Stakeholder. Broadly defined as regulators, concerned citizens, environmental groups, and other appropriate public and private interested parties.

Statistic.[13] **A computed or estimated statistical quantity** such as the mean, the standard deviation, or the. correlation coefficient.

Stressor. Any physical, chemical, or biological entity that can induce an adverse response.

Sublethal.[4] Below the concentration that directly causes death. Exposure to sublethal concentrations of material may produce less obvious effects on behavior, biochemical and/or physiological functions, and histology of organisms.

Synergistic.[2] Situation in which the combined effect of two chemicals is much greater than the sum of the effect of each agent given alone.

Taxon.[3] A taxonomic group or entity which are hierarchial levels in the biological classification of organisms (e.g., family, genus, species).

Threshold Concentration (or Level).[4] A concentration (or exposure level) above which some effect (or response) will be produced and below which it will not.

Toxicity Assessment. Review of literature regarding the **toxicity of any given material to an appropriate receptor.**

Toxicity Test.[4] The means by which the toxicity of a chemical or other test material is determined. A toxicity test is used to measure the degree of response produced by exposure to a specific level of stimulus (or concentration of chemical).

Toxicity Value.[5] A numerical expression of a substance's dose-response relationship that is used in risk assessments.

Toxin. A poisonous substance.

Trophic Level.[7] A functional classification of taxa within a community that is based on feeding relationships (e.g., aquatic and terrestrial plants make up the first trophic level, and herbivores make up the second).

Update.[4] A process by which materials are transferred into an organism.

Uncertainty.[14] Imperfect knowledge concerning the present or future state of the system under consideration; a component of risk resulting from imperfect knowledge of the degree of hazard or of its spatial and temporal distribution.

Volatilization.[3] The conversion of a chemical substance from a liquid state to a gaseous vapor state.

Xerophyte.[3] **A plant adapted to life in areas where the water supply is limited.**

Endnotes

[1] Krebs 1978, [2] Cooperrider et al. 1986, [3] Parker 1994, [4] Rand and Petrocelli 1985, [5] U.S. EPA 1989a, [6] Amdur et al. 1991, [7] U.S. EPA 1992a, [8] Merriam-Webster 1975, [9] Freedman 1989, [10] U.S. EPA 1989b, [11] Calow 1993, [12] ASTM 1993a, [13] Sokal and Rohlf 1981, [14] Suter 1993, [15] U.S. EPA 1992b, [16] Wallace et al. 1981, [17] Curtis 1983, [18] Sullivan 1993, [19] ASTM 1993b, [20] Ludwig and Reynolds 1988.

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